

Partial Differential Equation Analysis in Biomedical Engineering

Aimed at graduates and researchers, and requiring only a basic knowledge of multi-variable calculus, this introduction to computer-based partial differential equation (PDE) modeling provides readers with the practical methods necessary to develop and use PDE mathematical models in biomedical engineering. Taking an applied approach, rather than using abstract mathematics, the reader is instructed through six biomedical example applications, each example characterized by step-by-step discussions of established numerical methods, and implemented in reliable computer routines. Adopting this technique, the reader will understand how PDE models are formulated, implemented, and tested. Supported by a set of rigorously tested general purpose PDE routines online, and with enhanced understanding through animations, this book will be ideal for anyone faced with interpreting large experimental data sets that need to be analyzed with PDE models in biomedical engineering.

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Cover illustration: 3-D plot of antigen concentration as a function of distance from an antibody interface and time. The original plot was generated by the Matlab routines in Chapter 2.

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